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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/632,570	08/01/2003	Jhon-Jhy Liaw	TSM03-0196	6324
43859	7590	07/18/2006	EXAMINER	
SLATER & MATSIL, L.L.P. 17950 PRESTON ROAD, SUITE 1000 DALLAS, TX 75252			VINH, LAN	
			ART UNIT	PAPER NUMBER
			1765	

DATE MAILED: 07/18/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/632,570	<b>Applicant(s)</b> LIAW, JHON-JHY	
	<b>Examiner</b> Lan Vinh	<b>Art Unit</b> 1765	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 12 May 2006.  
 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.  
 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-5,7-16 and 18-38 is/are pending in the application.  
     4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
 6) ☒ Claim(s) 1-5,7-16 and 18-38 is/are rejected.  
 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
     a) ☐ All    b) ☐ Some \* c) ☐ None of:  
         1. ☐ Certified copies of the priority documents have been received.  
         2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
         3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-5, 7-15, 28-38 rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The specification does not provide a positive support for the newly added limitation of "such that the inactive regions are minimally etched", as recited in claims 1, 28, and a guideline to what is defined by "minimally etched". Claims 2-5, 7-15, 29-38 are rejected under 112, first paragraph because they depend on claims 1, 28

2. For the purpose of examination, the limitation of "such that the inactive regions are minimally etched" is best understood as the inactive regions are slightly etched/ not etched

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-3, 8-11, 15 are rejected under 35 U.S.C. 102(e) as being anticipated by Maszara et al (US 6,486,038)

Maszara discloses a method of isolation of active islands on a SOI device. The method comprises the steps of:

applying a mask layer 22 to a silicon/active layer 16 (col 5, lines 20-30; fig. 5), the layer 16/active layer being on an underlying layer 14 (fig. 5)

patterning the mask layer 22 to expose/define masked areas/active regions and unmasked/inactive regions of the active layer, the unmasked regions/inactive regions of layer 16 is not etched/minimally etched (fig. 5)

oxidizing the unmasked/inactive region of layer 16 to fully oxidize the unmasked regions/ active region so that the masked/active regions of the layer 16 are isolated from each other, the underlying layer 14 is covered in the unmasked/inactive region (col 6, lines 5-10; fig. 7)

Regarding claim 2, Maszara discloses the layer 516/active layer is an active layer of a silicon-on-insulator wafer (col 5, lines 57-59)

Regarding claim 3, Maszara disclose the step of partially removing the layer 50 in the unmasked regions/inactive regions (fig. 5)

Regarding claim 8, Maszara discloses that the mask layer 20 comprises SiN (col 5,

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Lines 26-28)

Regarding claim 9, Maszara discloses the step of removing the layer 20/mask layer on the active layer after oxidizing the layer 16 (fig. 9)

The limitation of claim 10 has been discussed above

Regarding claims 11, 15, Maszara discloses performing the oxidation at 1000 degree C in an oxygen-containing atmosphere (col 6, lines 44-46)

5. Claims 28-30, 34-37 are rejected under 35 U.S.C. 102(b) as being anticipated by Maszara et al (US 6,486, 038)

Maszara discloses a method of isolation of active islands on a SOI device. The method comprises the steps of:

applying a mask layer 22 to a silicon/active layer 16 of a SOI wafer (col 5, lines 20-30; fig. 5), the SOI having a substrate layer, the active layer and an insulator 14 in between (col 4, lines 33-35)

patterning the mask layer 22 to expose/define masked areas/active regions and unmasked/inactive regions of the active layer, the unmasked regions/inactive regions of layer 16 is not etched/minimally etched (fig. 5)

oxidizing the SOI wafer such that the oxidized areas of the layer 16/active layer extend through to the insulator 14 , the insulator layer 14 is not exposed in the unmasked/inactive regions (col 6, lines 5-10; fig. 7)

Regarding claims 29, 34, Maszara discloses patterning the mask layer with photoresist ( col 5, lines 24-26)

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Regarding claim 30, Maszara discloses that the mask layer 20 comprises SiN (col 5, Lines 26-28)

Regarding claim 37, Maszara discloses performing the oxidation at 1000 degree C in an oxygen-containing atmosphere (col 6, lines 44-46)

Regarding claim 35, Maszara Regarding claim 9, Maszara discloses the step of removing the layer 20/mask layer after etching the layer 16 (fig. 9)

The limitation of claim 36 has been discussed above

### ***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 5, 14, 27, 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maszara et al (US 6,486,038) in view of Mirbedini et al (US 6,864,152)

Maszara method has been described above. Unlike the instant claimed inventions as per claim 5, Masaza fails to disclose that the mask layer having a thickness of 10-1500 angstroms

Mirbedini discloses a method of fabricating trenches comprises the step of forming a mask layer 202 having a thickness of 50-500 angstroms (col 5, lines 50-52)

One skilled in the art at the time the invention was made would have found it obvious to modify Maszara method by forming a mask layer having the thickness as taught by

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Mirbedini because Mirbedini discloses that the mask layer may have a thickness of 50-500 angstroms as known in the art (col 5, lines 48-50)

Unlike the instant claimed inventions as per claims 14, 27, 37, Maszara fails to disclose performing the oxidizing step in an ambient comprising oxygen to create an oxidation layer about 25-800 angstroms

Mirbedini discloses a method of fabricating trenches comprises the step of performing an oxidizing step in an ambient comprising oxygen to create an oxidation layer about 50-500 angstroms (col 7, lines 20-25)

Hence, one skilled in the art at the time the invention was made would have found it obvious to modify Maszara method by performing the oxidizing step in an ambient comprising oxygen to create an oxidation layer as per Mirbedini because Mirbedini discloses that it is conventional to grow an oxide under oxygen in a furnace, the oxide thickness may vary from about 50-500 angstroms (col 7, lines 15-24)

8. Claims 16, 18-19, 21-22, 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maszara et al (US 6,486,038) in view of Ahn et al (US 2002/0022308A1)

Maszara discloses a method of isolation of active islands on a SOI device. The method comprises the steps of:

applying a mask layer 20 to a silicon/active layer 16 of a SOI wafer (col 5, lines 20-30; fig. 5), the SOI having a substrate layer, the active layer and an insulator 14 in between (col 4, lines 33-35)

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patterning the mask layer 20 to expose areas of layer 16 (fig. 5)

etching the SOI wafer to partially expose areas of layer 16/active layer without exposing later 14, a portion of layer 16 having a thickness remains in the etched region (col 5, lines 49-54; fig. 6)

oxidizing the SOI wafer such that the oxidized areas of the layer 16/active layer extend through to the insulator 14 (col 6, lines 5-10; fig. 7)

Unlike the instant claimed invention as per claim 16, Maszara fails to disclose that 25 angstroms to 400 angstroms of the active layer remaining in the etched region although Maszara discloses that the portion 28 of layer 16 remains in the etched region having a thickness selected to be the same as the thickness of the sidewall oxide liner (col 5, lines 65-67; col 6, lines 1-4)

Ahn discloses a method of preventing semiconductor layer from bending comprises a step of forming a sidewall oxide liner 133 having a thickness of 30-300 angstroms (col 3, paragraph 0046)

Since Maszara discloses that the portion 28 of layer 16 remains in the etched region having a thickness selected to be the same as the thickness of the sidewall oxide liner, one skilled in the art at the time the invention was made would have found it obvious to modify Maszara by etching the SOI wafer to partially expose areas of layer 16/active layer so that a thickness of 30-300 angstroms remains in the etched region in view of Ahn teaching because Ahn discloses that an oxidation layer having a thickness of 30-300 angstroms prevents an SOI layer from bending upon subsequent oxidation (col 3, paragraph 0046)



Regarding claim 18, Maszara discloses patterning the mask layer with photoresist (col 5, lines 24-26)

Regarding claim 19, Maszara discloses that the mask layer 20 comprises SiN (col 5, Lines 26-28)

Regarding claims 21-22, Maszara discloses performing the oxidation at 1000 degree C in an oxygen-containing atmosphere (col 6, lines 44-46)

The limitation of claim 25 has been discussed above

9. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Maszara et al (US 6,486,038) in view of Ahn et al (US 2002/0022308A1) and further in view of Chung et al (US 2003/0203285)

Maszara as modified by Ahn has been described above. Unlike the instant claimed invention as per claim 24, Maszara and Ahn fail to disclose removing the mask after oxidizing the active layer through a wet-dip process although Maszara discloses removing the mask 22/photoresist after oxidizing (fig.4)

Chung discloses a method for fabricating mask comprises a step of removing a photoresist by a wet dip (col 2, paragraph 0020)

One skilled in the art at the time the invention was made would have found it obvious to modify Maszara and Ahn by removing the mask 22 by a wet-dip as per Chung because Chung discloses that the photoresist is removed preferably by a wet dip to prevent damage (col 2, paragraph 0020)

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10. Claims 4, 7, 12-13, 31-32, 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maszara et al (US 6,486,038) in view of Tseng (US 2002/0090763)

Maszara method has been described above. Regarding claims 7, 31, Maszara discloses that all the layer 16 remains in the unmasked/inactive regions (fig. 5), forming an oxide and nitride layer as masking layer ( col 5, lines 22-25; fig. 6). However, unlike the instant claimed invention as per claims 4, 31-32, Maszara fails to disclose the specific thicknesses of the active layer, the oxide and nitride masking layer

Tseng discloses a method of forming a substrate in a SOI wafer comprises the step of forming a silicon/active layer having a thickness of 1000 angstroms ( col 2, lines 1-5)

One skilled in the art at the time the invention was made would have found it obvious to modify Maszara method by forming an active/silicon layer having a thickness of 1000 angstroms in view of Tseng because it is conventional in the art to form a silicon layer having a thickness of 1000 angstroms as taught by Tseng

Unlike the instant claimed inventions as per claims 12-13, 38, Maszara fails to disclose using furnace anneal process to perform the oxidation step

Tseng also discloses performing an oxidation process using furnace oxidation process (paragraph 0018). One skilled in the art at the time the invention was made would have found it obvious to modify Maszara method by using a furnace anneal process to perform the oxidation step because it is conventional in the art as taught by Tseng

Since, Maszara discloses that the thickness of a layer is desired to be different depending on the oxidation step (col 6, lines 65-67), one skilled in the art at the time the invention was made would have found it obvious to discovering an optimum value for

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the thicknesses of the oxide and nitride layer since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980)

11. Claims 20, 23, 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maszara et al (US 6,486,038) in view of Ahn et al (US 2002/0022308A1) and further in view of Tseng (US 2002/0090763) based on the same ground of rejection as set forth in paragraph 10 above

### ***Response to Arguments***

12. Applicant's arguments filed 5/12/2006 have been fully considered but they are not persuasive.

The applicants argue that the etching steps in Maszara are conventional, which shows that the active silicon layer is etched considerably whereas claims 1, 28 specify minimal etching of the active region, which is unconventional. This argument is unpersuasive because it does not commensurate with the scope of claims 1, 28 because claims 1, 28 require "such that the inactive regions are minimally etched". Since Maszara discloses that the unmasked regions/inactive regions of layer 16 is not etched/minimally etched (fig. 5) (paragraph 4 above), Maszara teaching meets the requirement of "such that the inactive regions are minimally etched", as recited in amended claims 1, 28

The argument that Maszara does not disclose any specific thickness of the etched layer, as required in claim 16, is moot in view of the new ground of rejection of claim 16

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set forth in paragraph 8 above

13. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

### ***Conclusion***

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lan Vinh whose telephone number is 571 272 1471. The examiner can normally be reached on M-F 8:30-5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571 272 1465. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to be 'LV', is written above the typed name and date.

LV  
July 10, 2006